SOIL conservation

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This month's articles are as varied as October foliage. The lead article discusses minimum tillage. Is it revolutionizing farming? To find the answer, Vincent Price, an Information Division writer, went to Woodford County, Ill., and talked to SCS people in the county, to county officials, and to the farmers themselves.

Other articles discuss a water management and erosion control system in Alabama, a girls' conservation camp in Wisconsin, a nature trail for the blind in Massachusetts, and an ASCS-SCS sponsored beef project in Michigan.

COVER: A chiseled field is a common sight in October in Woodford County, Illinois. The rough ridges and crop residue will protect the soil during the winter months. (See article on page 43.)

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Minimum tillage:

looks like a winner

by Vincent J. Price
Information Division, SCS
Washington, D.C.

It's called the tillage revolution. It's said to save the farmer time and labor. It's said to increase crop yield most of the time and to reduce soil erosion. It's said to conserve water and provide cover during winter.

Men who know farming speak of minimum tillage as perhaps the most important development in agriculture since hybrid corn. Some say that the American farmer can now throw away his moldboard plow.

Others are less certain.

A farmer in Woodford County, Illinois, looking over his field of soybeans—a field tilled according to the new method—expressed his personal doubts about minimum tillage as he winced from the glare reflecting off his combine. "You know," he said, "those old methods—plowing and discing and harrowing—I'm still not 100 percent away from them. Our fathers and grandfathers knew no other way."

Exactly what is minimum tillage? How has it revolutionized farming? In the Corn Belt minimum tillage often works like this:

After the harvest, the crop residue is chopped or shredded, and a chisel loosens and opens up the subsoil to create a series of rough ridges that help water to soak in and prevent soil blowing. The crop residue, which remains on top of the soil, protects the soil from wind and water erosion during the nongrowing seasons.

In the spring, the farmer uses no-till equipment to apply fertilizer and herbicides and plant all in one operation. The soil is disturbed as little as possible; under some practices, it is opened up only to a width of 2 or 3 inches. Much of the residue from the previous crop remains on the soil as a protective cover. A field that is plowed according to the old method can lose many tons of soil per acre because the protective cover is buried below the surface.

Minimum tillage has swept across the nation in the last 5 years. Today, it is used on 1 out of every 10 acres planted to corn, soybeans, or sorghum.

In 1967 in Illinois, the Soil Conservation Service, the Cooperative Extension Service, and the Agricultural Stabilization and Conservation Service, through the Illinois Conservation Practices Committee, launched a program to promote minimum tillage. First they settled on a name for the practice—conservation tillage. (The practice is known by several other names in different parts of the country.) They offered cost-sharing for the practice in 10 pilot counties. The immediate goal was to establish conservation tillage on 10 to 12 farms in each pilot county. It was hoped that the success of a dozen farmers would get the program off the ground.

Woodford County was one of the 10 pilot counties. Twelve farms began using conservation tillage in the county in 1967. Since then the practice has spread to more than 60,000 acres of county land.

Woodford County farmers who use conservation tillage do not all follow the same procedure. Do you have to shred the residue? What tillage implement should you use? Does it pay to further cultivate the soil after the original single tillage? Every farmer seems to have his own answers, and every farmer experiments.

"Last fall I chopped the stalks and put on fertilizer. I chisel plowed once. In spring I put on liquid fertilizer and herbicides;

then I planted with a no-till planter. I didn't do any cultivating after the planting." The speaker, Leland Klein, paused, and then continued, "I did cultivate some other fields, and it was cleaner where I cultivated."

Keeping his fields clean—preventing weeds from growing up around his crops—is important to Klein. There's some feeling that the undisturbed soil of conservation tillage is more amenable to weeds. And, as the SCS district conservationist in Woodford County, Henry Blunier, well knows, "If a farmer can't keep weeds out, he won't care about minimum tillage—he'll go back to plowing."

Most farmers in the county are satisfied with their weed control. Earl Bowald, for example, reported, "My tillage involves either shredding or discing stalks and chisel plowing in the fall. I get tremendous weedkill using this tillage system and chemicals."

A potentially more serious threat than weeds was posed in 1970 by corn blight. Would the 1970 corn residue infect the 1971 crop? "A lot of farmers were afraid it would, but it didn't," reported Blunier.

Other possible disadvantages of minimum tillage—increased insect pests and a cooler soil in spring—were not apparent in Woodford County.

There has been some question in the county about whether to shred or chop or merely chisel the residue. Running a chisel through a soybean field, it seems, is sufficient to break up residue, but some farmers feel that the heavier cornstalks should be shredded. Others have decided that shredding is an unnecessary expense.

Bob Kennell stated, "I used to shred but no more! It's not necessary." Leland Klein also is content to chop the stalks with a disc: "By spring the stalks pretty much break down into the soil."

Blunier and the county extension agent, W. M. Sager, suggested that even chopping might not be needed. Sager said, "It's not necessary to chop the residue, provided the chisel is adjusted so that it will not be clogged by stalks."

There is no question about the advantages of conservation tillage. The advantage most farmers talk about is increased yield. Blunier admitted, "If a farmer doesn't think he'll get at least as high a yield as he would with conventional plowing, he won't try it." But Woodford County farmers, for the most part, are satisfied with their yields.

"One farmer," related Blunier, "used conservation tillage on part of his land and, with everything else the same, increased his yield by 8 bushels per acre. Now, that's not true everywhere, but I'd rather have them get 8 bushels more than 8 bushels less."

A second advantage is the savings in time and labor. There are the expected benefits from decreased use of tractors and other machinery, and the unexpected benefits, such as Bob Kennell got through decreased erosion: "We saved ourselves a lot of maintenance work on our waterways. Since we started this tillage, they've stayed in fine shape. In 4 years, no erosion, no sediment."

The biggest advantage lies in the protection that minimum tillage gives the soil. Earl Bowald, looking over his farm, put it this way: "This field has lots of little ridges in it, so erosion has always been a problem. Now, with this tillage, I can get the erosion under control."

About 30 percent of Woodford County is under conservation tillage, which means that about 70 percent is not. "The methods our grandfathers used are strongly implanted in many men," said Sager, the extension agent. "To us this new tillage method is a technical change; to others it's a social change."

So there is doubt and speculation about minimum tillage mixed with appreciation and enthusiasm. But early returns are in, and they indicate an eventual landslide for this revolutionary practice. ♦

A choice: a plowed field (top, left) and the sheet erosion and soil blowing that invariably follow; or a minimum tilled field (top, right) and a soil protected by a cover of crop residue.
A chisel (left): it opens up and loosens the subsoil, yet protects the topsoil.
The harvest (bottom): minimum tillage increased a farmer's corn yield by 8 bushels per acre.

Runoff goes underground

by Morris S. Gillespie
Public information officer, SCS
Auburn, Alabama

"I have always thought water could be handled underground better than above ground." These are the words of R. V. Crews, a crop and livestock farmer in the Piney Grove community near Geneva, Alabama, who recently installed an underground system on his farm for disposing of excess water without damage to his or his neighbor's property.

"Now the runoff doesn't wash across my field eroding and carrying sediment and other pollutants to lakes and streams below," Crews said.

Crews previously had a terrace system that he said did not lend itself to the efficient use of modern farm equipment and allowed sediment to be washed from his field and deposited on his neighbor's land below. He also had vegetated waterways to carry water down the slopes, but some chemicals now used in farming destroy vegetation, making it difficult to maintain waterways.

In the new system, water collected by parallel terraces is carried to the bottom of a slope by a 6-inch underground plastic pipe.

Jimmy Holland, the SCS district conservationist, and other SCS people in the area helped Crews with the design and layout of his water management and erosion control system.

Holland said the system is designed also to promote better absorption of rain and reduce the loss of water through flooding.

Henry Miller, SCS state conservation engineer, said the system is being tried on a few other farms in Alabama; he thinks it will fill a real need in erosion control. "The cost of installing the underground pipe runs about the same, or a little higher, as that of constructing vegetated waterways, but the maintenance cost in future years can be much less," Miller said.

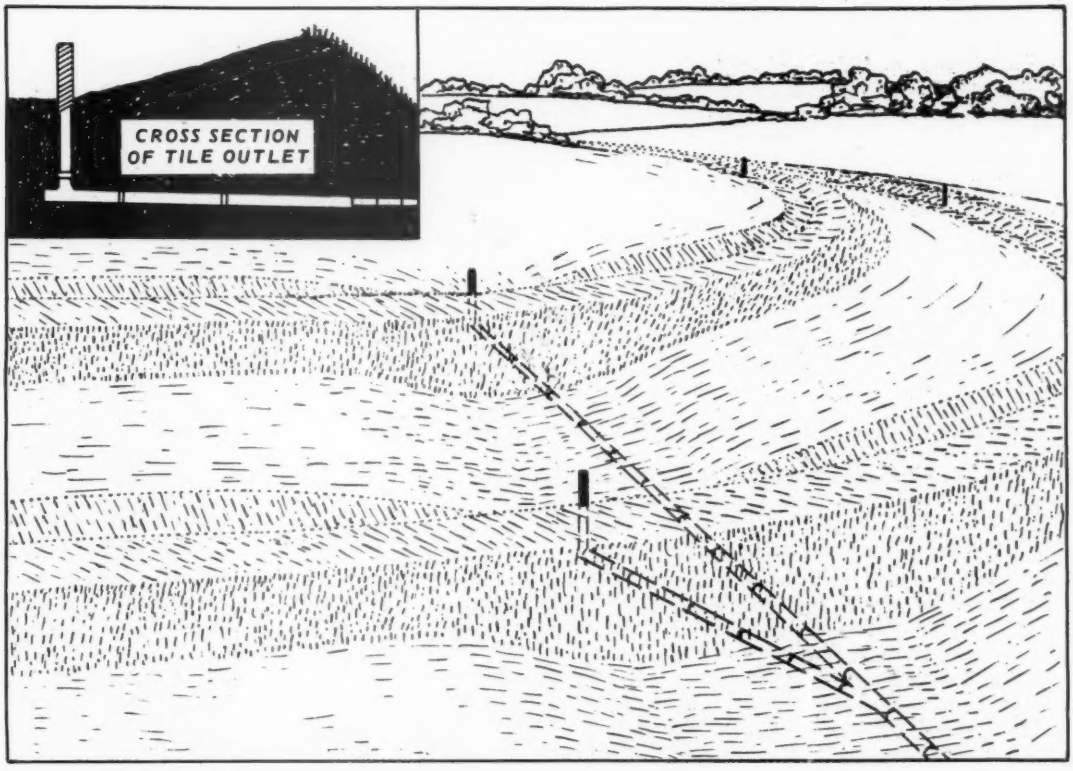
The installation of the pipe system on Crews' 15-acre field cost $160, and that, Crews said, is less than the cost of a waterway. He also said that he could not have established grass in the waterway because of the slope, the type of soil, and the heavy amount of water going into it. He said that without the pipe system, runoff water would cut ditches 4 feet deep; these would divide the field, and he would have to turn the large farm equipment around in the middle of the field. The ditches, Crews estimated, would have taken up 2 acres of good cropland.

"This new water-disposal system has not only helped me but also my neighbor, Tommy Davis," commented Crews. "Very little sediment is washed from my fields into Davis' fish pond. The water drains out slowly, allowing the sediment to settle out and stay on my field."

All of Crews' cropland is protected by the new system now except for 40 acres, and Crews has already asked SCS for help in installing the new system there next year.

Crews and his son farm 300 acres. They cultivate 100 acres; most of the rest is improved pastureland for their 70 head of Angus cattle. About 25 acres are in peanuts, and more than 75 acres are in corn and soybeans.

It is hard to see how Crews could have time for recreation, but he likes to fish in his two ponds. He believes people live longer if they take time out from work for fishing. One of his two ponds is stocked with shell crackers, bass, and bluegills and the other with catfish. ♦



R. V. Crews (left), an Alabama farmer, and Jimmy Holland, SCS district conservationist, are observing conditions at a spot where runoff leaves the field through an outlet pipe.
A nonpolluting water management and erosion control system (top). The parallel terraces have a grade that directs excess water to the low point of the terrace. Extra height is added to the terrace at this point to act as a small dam to hold the collected water until it drains safely through a corrugated plastic riser outlet. An underground pipe carries the water from each terrace to the bottom of the slope.

Conservation camp

by Cynthia Gleason
Department of Natural Resources
Madison, Wisconsin

At many girls' camps the girls guide horses along wooded bridle paths or practice swimming strokes to pass proficiency tests; boating and handicrafts are everyday activities.

Not at the girls' camp in Wyalusing State Park, Wisconsin. There hardhats and heavy leather boots are standard equipment for the girls.

This park lies south of Prairie du Chien, where the Wisconsin River meets the Mississippi, in an area first seen by French explorers more than 300 years ago. The spot was chosen by the Wisconsin Department of Natural Resources (DNR) to educate girls in the field of conservation.

Wisconsin has always been a leader in conservation, and this girls' camp is one of the state's unique innovations. Last summer, in mid-June, for the fourth consecutive year, 60 girls gathered at Wyalusing for a week-long comprehensive study and action-oriented program.

Girls' Conservation Camp, the official name, was the original idea of Robert O. Ellingson, DNR chief of conservation education. Ellingson and the two other founders, John Semo, also with DNR, and Mrs. Rosemary Fleming, Dane County naturalist, chose a group camping unit at Wyalusing as the most practical location for the camp.

Since the first session in 1968, the founders, other conservation specialists, and former campers who return as counselors have been part of the staff.

Ellingson, coordinator of the camp, feels its success is due to the quality of students and staff. He said the girls welcome the opportunity to choose their own form of creative expression. Most

Pruning trees is easy?

How to fight a (simulated) forest fire.

Let's build a bird house.

of the girls who come to Wyalusing have shown interest in conservation through school or club activities; local conservation organizations often pay at least part of the $60 fee.

Ellingson believes that women's roles in deciding environmental issues are very important. "Women are very sensitive to human needs and to individual rights," he said.

However sensitive the girls may be, they come to camp prepared to work. Last summer, they set up an archery range, cleared trails, and cut trees and spread gravel to form a fire circle —all for the benefit of future campers. Nature studies, forest management activities, bird hikes, night watches, and time out for individual projects were also part of the week's schedule. The girls spent their spare time working on terrariums and plant collections, making spider cages, mounting butterflies, sketching, writing, and taking pictures for conservation groups at home.

Evenings at the camp were spent discussing opportunities and educational requirements for careers in the environmental and conservation fields with specialists from the Soil Conservation Service and the U.S. Fish and Wildlife Service, environmental journalists, and others currently employed in conservation work.

What draws these girls to the woods? For most it is their genuine concern for the environment and their love of the outdoors. The program is designed to further the girls' interest in community conservation projects and to encourage individual environmental responsibility.

Several girls have decided to combine their interest in conservation with careers in other fields.

"For the girls who know what the word ecology means, camp is a great stimulation," said Mrs. Fleming, who has worked closely with the girls as a naturalist. "The girls become aware of community problems, and we try to help them determine solutions and develop the understanding that will be needed to make intelligent resource-use decisions in the future. In many different ways, they will be instrumental in leading the action." ♦

SCS conducts flood insurance studies for HUD

California has 114 of the 1,200 communities across the country approved for flood insurance to date under the National Flood Insurance Program of the Federal Insurance Administration (FIA), Department of Housing and Urban Development (HUD).

Established under the National Flood Insurance Act of 1968 (Public Law 90-448, as amended), this program makes flood and mudslide insurance, in specified amounts, available under federal auspices to property owners in approved communities. Such insurance was previously not available from private insurers.

After communities are approved for flood insurance, detailed studies are made to determine flood hazard zones. More than 400 of the communities approved for flood insurance still need to be studied.

To date, SCS has participated in 117 flood insurance studies in 33 states and Puerto Rico. Ninety-three of these studies have been completed.

Since May 1971, the Soil Conservation Service has completed flood insurance studies of four California communities: Walnut, El Cerrito, Portola Valley, and Thousand Oaks.

The California studies were made by SCS's river basins planning staff in Berkeley with the help of local area and work-unit personnel. Technical guidance was provided by SCS's engineering staff in the state and the Engineering and Watershed Planning Unit in Portland, Oregon, under the general guidance of the River Basins Division in Washington, D.C.

SCS became involved in flood insurance studies mainly because of its hydraulic expertise and the flood hazard information it collects in carrying out its regular programs.

Every 2 or 3 months FIA prepares a list of applicant communities approved for flood insurance and sends it to federal agencies interested in conducting flood insurance studies in those communities. These agencies are the Soil Conservation Service, the U.S. Army Corps of Engineers, the Tennessee Valley Authority, the National Oceanic and Atmospheric Administration, and the U.S. Geological Survey. The cost of obtaining the technical data, analyzing the flood hazards, and preparing a report is on a reimbursable basis from FIA.

FIA also contracts studies with state agencies and private engi-

neering consultants.

Study efforts are concentrated in critical, flood-prone urban areas, both developed and those having a potential for development. A study is usually completed in 6 to 8 months.

Flood insurance studies include data about and maps showing areas subject to inundation by 100-year and 500-year frequency-of-occurrence floods. FIA determines the insurance premium rates for the various flood hazard zones based on the relationship of the hydraulic and flood-frequency data (furnished by SCS) to depth-damage curves.

In carrying out a flood insurance study, SCS engineers and other specialists talk to city, county, and flood-control district officials, planners, and engineers and to flood-plain residents. They gather historical flood information, base maps, and streamflow and channel data. They survey cross sections of the valley and channel; make hydrologic and hydraulic studies to determine the 10-, 25-, 100-, and 500-year routed peak discharges at each cross section; and determine water surface profiles by automatic data processing programs.

The hydraulic data are analyzed, and a report is prepared for FIA. The report includes flood-zone maps delineating four basic flood zones.

Any community, county, or township having legal authority to pass and enforce flood-plain land use and development ordinances and regulations is eligible to apply for flood insurance. Application is made by writing to the Federal Insurance Administration, Department of Housing and Urban Development, 451 Seventh Street, S.W., Washington, D.C. 20410 (telephone: 202-755-5284).

As soon as an applicant community becomes eligible, subsidized flood insurance for existing structures is available under the emergency program, pending completion of a detailed flood insurance rate study. At this point SCS, or one of the other agencies or firms, carries out a technical study to delineate the flood hazard areas.

Insurance coverage up to $17,500 for single-family residences (including townhouses) and up to $30,000 for all other structures can be purchased at once from any insurance company or agent licensed in the state. Maximum coverage of up to $5,000 for household contents is also available to either the owner or tenant at subsidized rates. For example, the total premium under the emergency program for the maximum coverage on a single-family residence valued at $38,000, with $12,000 contents value would be: House, $17,500 (max.) x $0.25 per $100 coverage = $43.75; contents, $5,000 (max.) x $0.35 per $100 coverage = $17.50; total annual premium = $61.25.

All structures used for residential, business, religious, or agricultural purposes and structures occupied by nonprofit organizations or owned by state or local governments are eligible.

After a flood insurance study is completed in the community, additional coverage of $17,500 on the structure and $5,000 on the contents can be obtained at higher, actuarial rates.

Flood insurance studies are an important part of the national flood insurance program. SCS's technical contributions to this program are benefiting urban and rural areas and flood-plain residents across the country. ♦

by Romeo A. Rivera
Civil engineer
River basins planning staff, SCS
Berkeley, California

They touch the environment

by Henry J. Ritzer
Resource specialist, SCS
Amherst, Massachusetts

A troop of young girls moves down the shady trail through a Massachusetts woodland. One girl stops and wraps her arms around an old oak tree. Another girl reaches for a drooping, soft-needled branch of white pine and touches it tenderly. Two girls drop to their hands and knees and thrust their faces into a clump of sweet-smelling wild flowers. Voices ring with the delight of discovery.

Similar scenes occur several times a day at the 1,000-acre Robert Sever Hale Camping Reservation in Westwood, 10 miles southeast of Boston. Here, two interconnecting trails or loops are specially equipped to unlock the wonders of the out-of-doors for the visually handicapped by stimulating their senses of hearing, smelling, and touching.

Unlike many nature trails for the blind, these are no easy walk through a manicured garden, nor are they intended only for the blind. Each year hundreds of sighted people also use the trails, which traverse almost a half-mile of rugged terrain that was left in its natural condition except for the removal of hazardous brush, stones, and holes.

At each of the 40 stopping points along the trails, message plates in both Braille and regular lettering have been mounted on lecterns to describe the nearby natural elements. A special plastic rope, with feeler-markers to signal the stopping points, has been strung hip-high along the trails to help guide the handicapped hikers.

Further investigation at each step is invited by means of stout cords that lead to trees, shrubs, boulders, or rock outcrops. There are trees to embrace to achieve a sense of size; tree stumps with growth-rings to count for age; moss and fungus to run the fingers over; woodpecker holes to explore; a cedar swamp to moisten the hands and feet in; and aromatic clumps of plants such as sweet fern and sweet pep-

per bush to smell. On some days, the wind whistling through the branches of red pine and spruce trees adds to listening pleasure.

Popular with all hikers is a small level glade where fingers can explore a myriad of grasses and weeds.

In a pen at the end of the trails, which begin and end at the same place, there's a pet white-tail deer to nuzzle friendly hands.

The trails are the expression of many willing hearts and hands, according to Hale's executive director, James E. Earley. "The entire community is proud of this effort to bring nature awareness to the 10,000 sight-handicapped residents of Massachusetts," said Earley. "The project demonstrates the generous attitude of the 150,000 more fortunate people who come to the reservation every year for hiking, day camping, and outings."

Earley indicated that civic-organizations—notably from Dover and Westwood—donated materials, time, and labor to prepare the special trails. When funds were needed, the Massachusetts State Federation of Women's Clubs came rushing to the rescue. Materials for the two trails cost about $1,000.

Such organizations as the Norfolk Conservation District and Boston Museum of Science helped with the trail-side educational features. Soil Conservation Service people at Acton provided a resource inventory and helped with the location and layout of the trails.

The entire project was done in close cooperation with the Massachusetts Association for the Blind. "We wanted to help the blind enjoy nature as fully as possible," said Tony Spinelli, assistant director of the reservation. "What we have here stresses the interrelationships of soil, water, plants, and animals in our environment not only for the blind but for all people." ♦

Plant a pack of packeted plants

by Fred G. Aten
Area conservationist, SCS
Medina, Ohio

The small plane banked, the wings glistened in the morning sun, and the Ohio landscape stretched out fresh and green 800 feet below.

The two passengers looked down with appreciative but critical eyes. "What we need in Ohio is some kind of wildlife planting program," said John Wilson, shouting above the roar of the aircraft engine.

That was in the spring of 1956 when Wilson, the SCS district conservationist in Ashtabula County, and a friend were touring the county by air.

During the flight, the one thing most apparent to both men was the fact that the county was not taking advantage of its enormous wildlife potential. They could see from the air that many farm ponds, which provide the nucleus for high-quality wildlife areas, were grassed but had no trees or shrubs close by for wildlife. Farm and rural homesites and most suburban areas also fell critically short in providing food and cover for wildlife.

The reforestation, wildlife, and beautification packet program, conceived that spring morning in an airplane, has spread across the state of Ohio and is now sponsored in every county by soil and water conservation districts. Packets are made up by the local districts from materials purchased from nurserymen.

Millions of people have taken advantage of this program; they planted nearly 1½ million trees and shrubs across Ohio in the spring of 1972.

"We need more organizations that are honestly interested in improving our environment," said one landowner who knows well the results of his 4-year-old plantings.

The packet-planting program has really progressed. New people in increasing numbers are buying packets each year as a result of their neighbors' successes, and old customers are coming back because of their own success with the plants.

"The people of the state have made this planting program a success—people on farms, people on small suburban lots, people everywhere interested in improving their environment," said Robert E. Quilliam, the SCS state conservationist in Ohio.

The seedling plants included in the packets have proved their adaptability and value in providing a tree where a tree is needed —for wildlife or simply to add beauty to an area.

The plants in the packets vary somewhat across the state, but the primary plants are white and Austrian pine, Norway spruce, autumn olive, Canadian hemlock, arborvitae, larch, birch, American cranberry bush, and multiflora rose.

This program, conceived in the skies, is making Buckeye land beautiful—Ohio is a better place to live in because of it.♦

Mrs. John Michaels of Seneca County, Ohio, and her children start home with the wildlife planting packets purchased from the local conservation district.

A package deal

by Fred Kekko
District conservationist, SCS
Houghton, Michigan

Ruth Hanson
County executive director, ASCS
L'Anse, Michigan

Is farming dead in Michigan's Covington and Watton communities? Indeed not! It's alive—and in a more beautiful and more prosperous setting than before, according to cooperators with the Baraga County Soil Conservation District.

Changes in this area, in the upper peninsula of Michigan, have occurred mainly because of a beef cow-calf project started 3 years ago by the Agricultural Stabilization and Conservation Service and the Soil Conservation Service.

The project is designed for package installation of all the conservation practices needed on a particular unit of a farm. Practices cover the areas of soil acidity, fertility, legume seeding, water control, and water storage. Cost-sharing funds are available through the Rural Environmental Assistance Program (REAP) for installing practices that are part of a conservation system.

The loam soils in the county have always had good potential. But when the dairy industry died out, many fields were abandoned and brush moved in. Some farmers became interested in beef cow-calf operations, but few could afford to get started in the beef business, that is, until the ASCS-SCS beef project got underway.

Birdsfoot trefoil pasture has replaced brush, rocks, and tree stumps in this field on the Stuart Delene farm in Watton, Michigan. Delene is shown with his son.

To bring about the change, the land needed lime, water control, and increased fertility. The main conservation practices applied through the project, therefore, have been sod waterways, liming, reseeding, fertilizing, and stock watering ponds.

Herman Tilson, Covington township supervisor, expressed the enthusiasm of the people taking part in the special project: "This project certainly has boosted our economy. It has proved that a comfortable living can come from beef farming in our county. When all the project measures have been completed and our fields are producing good grasses and legumes for hay and pasture, the number of beef cattle could easily be doubled."

Tilson worked hard to get the project approved and is part of it himself.

To get the project underway in 1 year required teamwork between the Soil Conservation Service, the Agricultural Stabilization and Conservation Service, the Cooperative Extension Service, conservation contractors, and landowners. Now, in the third year of this project, teamwork is still very much in evidence. It has been a big factor in the success of the project.

In 1970, 106 acres in 8 farms were planted to pasture. Vegetative cover improvement practices were applied on 47 acres in 4 farms. Five farms each got a stock watering pond, and waterway shaping and seeding were carried out on 21 acres in 8 farms. ASCS provided $12,510 in cost-share funds for 33 practices.

In 1971, 18 farmers established new hay and pasture land seedings on 222 acres; improved 10 acres of vegetative cover with lime and fertilizer; constructed two farm ponds and 11 acres of sod waterways; and seeded 3½ acres of pond banks. REAP payments for 37 practices totaled $11,600.

In 1972, $16,300 were allocated to 18 farmers for establishing 230 acres of new pasture seeding, 12 acres of sod waterways, 5 livestock watering ponds, and 7 acres of pond-bank seeding.

"We have seen unsightly, brushed in, dying land turn into beautiful, lush, green areas," said Tilson in summing up his and his fellow beef farmers' appreciation of the project. "Until we became involved in this project, we never really knew how much we could benefit from the services available to us from ASCS, SCS, and other federal agencies." ♦

conservation in action

Water--to have and to hold

For years, farmers in Kansas' Timber Creek watershed, which takes in Cowley and Butler Counties, had been doing their best to hold soil and water on their farms. But they couldn't do much to prevent floods.

The city of Winfield also had a problem. It had a long history of salty wells, which provided the main water supply. Several other towns, as well as rural residents, hauled water from Winfield, so the problem of salty water was widespread.

When the Watershed Protection and Flood Prevention Act was passed in 1954, people in the Timber Creek watershed began making plans that would eventually solve both problems.

The Cowley County Conservation District (96 percent of the watershed is in the county) offered to help sponsor a watershed district with the objective of holding more water in the uplands to reduce flood damage.

A watershed district was formed, and a work plan was completed in 1965 with the help of SCS's watershed planning staff. Construction began in 1967.

The work plan called for a combined floodwater storage of 14,324 acre-feet in 34 reservoirs. This was more water than the farmers in the watershed could use, so the idea of sharing this water resource with others outside the watershed was discussed.

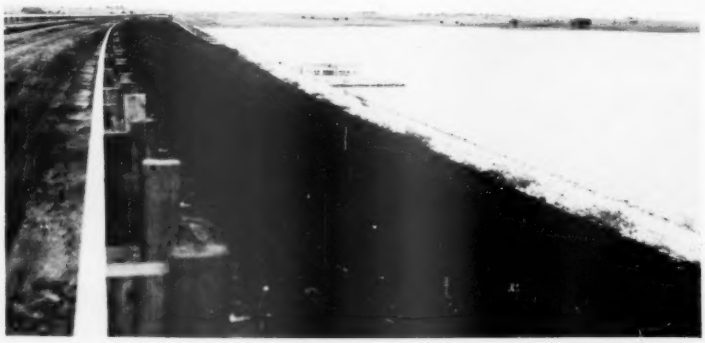
The watershed district board invited Cowley County cities to cosponsor a multipurpose project for city water and recreation. Winfield, tired of salty water, accepted with little inducement. It had been seriously considering an independent reservoir project on Timber Creek.

The 1,120-acre multiple-purpose Winfield reservoir was dedicated in the fall of 1970. One of the largest Public Law 566 watershed-project reservoirs in the nation, it has a conservation storage capacity of 25,000 acre-feet, of which 23,075 acre-feet are beneficial storage. This includes 5,000 acre-feet of floodwater storage, 9,075-acre-feet of municipal water for the city of Winfield, and 9,000 acre-feet for recreation use.

The approximate cost of the Winfield dam, including recreation use, was $2,173,000. The federal government shared about 48 percent of the cost under Public Law 566. An 8-mile pipeline to the filtration plant at Winfield and other features of the water system not part of the watershed plan were cost-shared by the U.S. Department of Housing and Urban Development.

About 869 acres of city land surrounding the lake are being turned into a public recreation area. Facilities include: picnic areas, fishing, swimming beach, boat ramps, restrooms, hunting areas, and wilderness camping.

The benefit-cost ratio of the entire project is $2.30 benefit per $1 cost. This project has affected the total environment for miles around. The two big problems have been solved: floods are being tamed, and Winfield and the surrounding areas have a new water supply. In addition, the public has an outdoor recreation center.—S. H. KELLER, *former district conservationist, SCS, Winfield, Kansas.* ♦



The Winfield dam forms a 1,120-acre reservoir, providing flood control, water supply, and recreation. A county blacktop highway has been relocated to go the length of the dam.

Effect of channel improvement on ground water studied

What long-range effects does channel improvement, as carried out in watershed projects, have on the supply of ground water in eastern North Carolina?

To answer this question, a study, covering parts of three counties and jointly sponsored by federal and state agencies, has gotten underway and probably will run through 1980.

Two Department of Agriculture agencies, the Agricultural Research Service and the Soil Conservation Service, are cooperating in the study with the U.S. Geological Survey and the Division of Ground Water, Office of Water and Air Resources, North Carolina Department of Natural and Economic Resources.

The 20-square mile study area is in the Creeping Swamp subwatershed in Pitt, Craven, and Beaufort Counties; it is within the Swift Creek Watershed Project area.

The Creeping Swamp subwatershed is part of the recharge area of the Castle Hayne aquifer, a major aquifer in eastern North Carolina affecting the water supply over a large area.

The ground water system underlying the Creeping Swamp subwatershed consists of two water-bearing strata. Nearest the surface is 15 to 20 feet of sand that contains some clay. The Castle Hayne aquifer, immediately below, is made up of lime rock less than 50 feet thick. The amount of water discharged into surface streams from the upper sand can have an important bearing on the amount of water available for the lower Castle Hayne aquifer.

The study seeks answers to four questions:

(1) What effect will improved channels—with smoothed banks, straightened water courses, and no impediments—have on recharge to the upper sand aquifer and ultimately to the Castle Hayne aquifer?

(2) How will improved channels in one watershed affect ground water and streamflow in adjacent watersheds?

(3) Is it possible to accomplish surface drainage and at the same time increase ground water recharge to the Castle Hayne aquifer?

(4) To what extent will improved channels affect ground water discharge into a stream during low-flow periods, such as drought?

To find these answers, the cooperating agencies have set up three stream gaging stations and five rainfall stations and have installed a system of strategically placed observation wells to check the two water-bearing strata—the shallow sandy aquifer and the Castle Hayne limestone.

Data from these observation points will be used with ground water data to determine the net effect of channel improvement on the hydrology system of the subwatershed.

"We believe this study will not only be helpful to us in North Carolina but also will provide useful information to people studying hydrology and related matters elsewhere," said State Conservationist Jesse L. Hicks. "We're looking forward to the answers as they come."—FRANK H. JETER, *public information officer, SCS, Raleigh, North Carolina.* ♦

Olympic-size pond

The town and village of Chatham and the town of Ghent, on the eastern shore of the Hudson River in New York, had no facilities for a summer youth program, so Arend Ooms and his sons, offered the 37-acre pond on their large dairy farm in Chatham.

In 1970, as cooperators with the Columbia County Soil and Water Conservation District, the Ooms had been assisted by the Soil Conservation Service in building the pond to benefit wildlife and provide family recreation.

The Ooms agreed to the use of their pond for the combined community youth program for the next 5 years.

Through the efforts of the communities and the pond owners, a beach and sanitary facilities were constructed in 1971. For 8 weeks that summer, an average of 60 youths used the pond 5 days a week—2,400 activity days

of swimming otherwise not available in these communities.

The success of the 1971 program prompted an expansion of activities for 1972. A larger staff gave instruction in swimming, and the season was expanded to 10 weeks.

The directors of the Columbia Conservation District recognized the Ooms' contribution by honoring them with a Conservation Civic Award.—JOHN C. TITCHNER, *district conservationist, SCS, Hudson, New York.* ♦

Living is easier

The people in Weakley County, Tennessee, believe in small-watershed projects. They have about 10 years of benefits on which to base their belief.

The Thompson Creek Watershed Project was authorized in 1958 and completed in 1969. Five floodwater-detention dams were built, 17 miles of channel were improved, 140 acres of bare roadbanks were vegetated, and 2,019 acres of gullied land were planted to trees.

"Aside from the primary benefits—reduced erosion and floodwater and sediment damage—recreation opportunities in the county have increased manyfold because of our watershed project," says Wayne Parham, chairman of the Weakley County Soil Conservation District.

One of the dams, built with financial help from the Tennessee Game and Fish Commission, formed Garrett Lake, a multipurpose lake that includes water supply for fish and wildlife.

Garrett Lake has boat docking facilities, a food concession, picnic tables, and restrooms. The area is used by Boy Scouts and Girl Scouts for camping.

All of the lakes provide fishing, boating, camping, and picnicking. The Tennessee Game and Fish Commission has stocked some areas with white tail deer. Many cottages have been built around the lakes.

"After 11 years we find that the Thompson Creek Watershed Project has proved far more beneficial to us than we could ever have imagined," states Parham. "The indirect benefits alone have brought as much additional income into the county as a small factory would bring.

"This was surely a worthwhile investment for our efforts. And now we're working on several other small-watershed projects that we know will be highly beneficial to the entire county."—J. S. CORBITT, *former district conservationist, SCS, Dresden, Tennessee.* ♦

Fishing is one of the extra benefits that the Thompson Creek Watershed Project has brought to Weakley County, Tennessee.

Recon . . .

A water-saving, pollution-free system of human waste disposal is being tried at South Dakota's Mt. Rushmore Memorial State Park, according to the *Dakota Farmer*. Instead of the usual 6 gallons of water per flush, the entire system operates with a total of 350 gallons of a low-viscosity, clear oil, continuously recycled. The wastes separate out of the medium and are then automatically transferred to a high-temperature incinerator, but they can also be tapped into an ordinary cesspool.

The Mt. Rushmore Memorial hosts up to 30,000 visitors daily during peak periods—about 2 million visitors a year. The new system is presently handling about one-third of the park's total. The system —whose main unit is about 6 by 6 by 6 feet in size—may have application in mountain cabins, farm residences, lake cottages, and even pickup campers and public campgrounds. The Black Hills Conservancy District is sponsoring the current 1-year trial.

Flash-flood warning. An automatic flood-alarm system is being set up by the National Weather Service. The first installation is going in near Wheeling, W.Va. Others will be operating within 2 years at Green Brook, N.J., Waynesboro, Va., in Wayne County, Ohio, and at sites to be chosen in several other eastern states. Triggered by an upstream water-level sensor, the alarm will automatically alert communities downstream.

Renew air and water. The retiring president of the American Association for the Advancement of Science, Dr. A. Spilhaus, said it in the weekly *Science*: "Just as we grow, use, and regrow food, we must continually clean, use, and reclean our air and water. To the culture of our renewable plant and fiber crops, which we call agriculture, we must now add 'atmoculture' and 'hydroculture'—a continuing job of renewing air and water to good quality for reuse."

Fastest growing minority. On the day you read this about 4,000 Americans—two-fifths of them living on farms, in small towns, or in other nonmetropolitan places—are celebrating their 65th birthday. They join the ranks of America's fastest growing minority—the aging. In 1970, one of every 10 persons in the United States was 65 or over, and nearly one of every nine of these lived in nonmetropolitan places.

Soil-blowing may be dangerous to your health. Two Kansas State University researchers have checked rural dust levels throughout middle America. Near cultivated areas—not grazing lands—they say that airborne particulates have often exceeded the federal standard for "severe air pollution" by as much as 1,500 percent for up to 7 weeks annually.

Ammonia is always in the air. ARS reports suggest, however, that the amount is increasing in city and rural areas and is passing through the soil to add to the nitrogen load of our waters. Scientists have come up with hard evidence that plants actually metabolize ammonia for up to 10 percent of their nitrogen needs. The findings underscore the role of plants in decontaminating the atmosphere.

Conservation in China. In a recent article from mainland China, columnist Joseph Kraft focused on that nation's achievements in flood control and soil conservation. More than 1,000 large reservoirs, tens of thousands of smaller upstream impoundments, and extensive application of conservation practices on the land were cited. The national symbol for all this is a now aged peasant, Chen Yung-kuei, whose mountain village in severely eroded southwest China is a model of conservation farming.

Ninety-one-year-old Charles Todd of White Cloud, Kansas, has received the Kansas Bankers Award for outstanding soil and water conservation on his 110-acre farm. Conservation practices established on the 40 acres of cropland include 3,192 feet of terraces, 3 acres of grassed waterways, and an erosion-control dam. Mr. Todd has lived on this farm all of his long life and has been blind for more than 10 years.

Rent-a-tree. In Germany, the owner of an apple orchard is reported to have met his labor shortage by renting trees to city people. For about $7 a year, the renter can enjoy the tree and harvest its fruit, according to *Avant Gardener,* published in New York.

Fir feed. In a test in Washington, Douglas fir, specially treated, proved a palatable and nutritious feed for steers. The process, according to I. A. Dyer, animal scientist at Washington State University, consists of treating the wood to remove part of the indigestible lignin and to expand the cellulose molecules so the enzymes of the animal can digest it. The final product looks like finely cut silage. Animals fattened on it made daily gains of 2.7 to 2.9 pounds and had less backfat than similar animals fed barley or other grains.

Review

The Department of Agriculture. BY WAYNE RASMUSSEN AND GLADYS L. BAKER. *1972. Praeger Publishers, Inc., 111 Fourth Ave., New York, N.Y. 10003. 257 pp., illus. $9.* This book describes USDA's evolution from its beginning in 1862. It deals largely with the functions assigned to the Department as a whole, rather than with the functions of individual agencies. This way, explains Dr. Rasmussen, the text does not become obsolete when internal changes such as reorganizations occur in the Department. Chapters are organized around major functions such as research, regulation, education, conservation, production adjustment, rural development, and international affairs. The book also discusses USDA's relationships with other departments, Congress, and the public.

A Comparison of Lysimeter-Derived Potential Evapotranspiration With Computed Values. BY J. L. MCGUINNESS AND ERICH F. BORDNE. *1972. USDA Tech. Bull. 1452. 71 pp., illus. $0.40.* Report compares data obtained through the various methods for estimating potential evapotranspiration (*PET*) with those from a lysimeter-derived "standard" *PET* curve as an aid to the selection of appropriate estimating methods for humid areas. It also incorporates in one place the computational techniques required by the various estimating schemes. Some of the estimating methods are arithmetically complex, and a "cookbook" approach to their solution should be helpful.

Saline Water Conversion Engineering Data Book. BY THE M. W. KELLOGG COMPANY FOR THE OFFICE OF SALINE WATER, *U.S. Dept. of the Interior. 1971. 461 pp., illus. $6.25.* Contains technical data on the physical properties of the chemicals and materials being treated, derived thermodynamic data, phase equilibria, equipment cost and economic factors, and design methods and standards.

Managing Our Environment. *1972. USDA Agr. Inf. Bull. 351. 48 pp., illus. $0.65.* The report covers some of the major environmental challenges facing scientists and regulatory officials working in agricultural research. Some of these challenges are: controlling sediment, animal wastes, and salinity; reusing sewage; properly using pesticides; and recycling food processing wastes. It discusses new ways to fight pests as alternatives to pesticides. And it points out that one of the challenges to scientists in agricultural research is to keep the landscape green. These scientists are concerned with the use of trees, turf, ornamentals, and related plants in protecting five environments: urban, suburban, transitional (areas that connect city and country), controlled (enclosed malls, offices, and museums, etc.), and rural.

Comprehensive Plans for Improving Rural Counties. BY ERLING D. SOLBERG. *Rev. 1972. USDA Agr. Inf. Bull. 316. 10 pp., illus. $0.15.* Describes the need for a comprehensive plan—an overall pattern for development. The plan should show how a county can best use what it has to become the kind of place it wants to be. It specifies how present and future improvements and uses of land and other natural resources should be related and is a guide to both public and private development activities.

Saline Water Conversion Summary Report, 1971-1972. *U.S. Dept. of the Interior, Office of Saline Water. 77 pp., illus. $1.* Provides information on the progress of the research and development of techniques and methods for desalting water. From the progress achieved to date, coupled with the advances realistically expected to be developed, desalination should have a substantial impact on the future water resource programs of the nation.

Biology and Ecology of Two Predators, *Geocoris pallens* Stål and *G. bullatus* (Say). BY GEORGE TAMAKI. *1972. USDA Tech. Bull. 1446. 46 pp., illus. $0.50.* A 5-year project (1965-70) was undertaken to study the biology and ecology of these two omnivorous predator species in the Yakima Valley of Washington. Because they most frequently occupied the same habitat, rearing and interbreeding experiments were conducted to authenticate their status. This report gives the results of the study.

Report of the 1970 Workshop on Fish Feed Technology and Nutrition. *1971. U.S. Dept. of the Interior, Fish and Wildlife Service, Resource Pub. 102. 207 pp., illus. $1.75.* This publication is a comprehensive report of the results of a workshop organized by the Food and Agricultural Organization in cooperation with the U.S. Bureau of Sport Fisheries and Wildlife. The report is divided into three sections—fish food processing, fish culture techniques, and fish nutrition —and contains 25 articles by specialists in private industry, federal and state governments, and universities.

Biology of Rust Resistance in Forest Trees: Proceedings of a NATO-IUFRO Advanced Study Institute, August 17-24, 1969. *1972. USDA Misc. Pub. 1221. $4.* The proceedings contains 54 papers. Fifteen of the papers assay the world's white pines—their intrinsic qualities, relative blister rust resistance, and international exchange—and the rest of the papers covers forest rust resistance in general. These papers are by specialists from the federal and state governments and universities of the United States and from governments and universities of The Netherlands, Germany, Canada,

Austria, South Korea, West Pakistan, India, Japan, Denmark, Sweden, Belgium, and Mexico.

Disaster Preparedness. *1972. Executive Office of the President, Office of Emergency Preparedness.* [*348*] *pp., illus. $2.75.* This report establishes a broad-based and comprehensive analysis of disaster preparedness in the United States. It gives the findings of a study of the major natural disasters occurring in the United States and presents potential solutions to prevent or minimize the loss of life and damage to property in disasters. Ten types of natural disasters are examined—river floods, tornadoes and windstorms, hurricanes and storm surges, forest and grass fires, earthquakes, landslides, tsunamis, volcanoe eruptions, frosts and freezes, and droughts.

Soil survey

Marshall County, Mississippi. BY M. C. TYER, W. E. BRIGHT, AND P. J. BARLOW. *1972. 70 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Yolo County, California. BY WELLS F. ANDREWS. *1972. 102 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Jones County, Texas. BY COLLETUS A. ROGERS, A. R. GOERDEL, AND H. D. GOOCH. *1972. 51 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Delaware County, Indiana. BY KELSO K. HUFFMAN. *1972. 66 pp., illus.; maps 4 inches to the mile (1:15,840).*

Otero County, Colorado. BY ROY J. LARSEN, DONALD R. MARTIN, AND M. BRUCE MCCULLOUGH. *1972. 83 pp., illus.; maps 4 inches to the mile (1:15,840).*

Genesee County, Michigan. BY SHELDON HOLCOMB. *1972. 113 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Meetings

November

12–15 National Association of State Universities and Land Grant Colleges, Washington, D.C.
12–16 National Water Resources Association, Salt Lake City, Utah.
12–17 National Association of State Departments of Agriculture, St. Croix, Virgin Islands.
13–15 Geological Society of America, Minneapolis, Minn.
13–21 National Grange, Hartford, Conn.
16–20 Adult Education Association of the USA, Minneapolis, Minn.
26–30 National League of Cities, Indianapolis, Ind.
27–29 National Land Use Policy Conference, sponsored by the Soil Conservation Society of America, Des Moines, Iowa.
27–Dec. 1 American Association of State Highway Officials, Phoenix, Ariz.
29–Dec. 1 National Conference of State and Federal Water Officials, Austin, Tex.

December

3–7 American Farm Bureau Federation, Los Angeles, Calif.
5–8 Western Forestry and Conservation Basin, Spokane, Wash.
6–7 National Association of Manufacturers, New York, N.Y.
11–15 American Society of Agricultural Engineers, Chicago, Ill.
13–15 Midwest Wildlife Conference, Des Moines, Iowa.
26–31 The American Nature Study Society, Washington, D.C.
26–31 American Association for the Advancement of Science, Washington, D.C.

January 1973

7–11 National Association of Home Builders, Houston, Tex.
10–11 National Council of Farmer Cooperatives, Orlando, Fla.
15–18 North American Game Breeders & Shooting Preserve Association, Inc., Topeka, Kans.
22–25 National Woolgrowers Association, Washington, D.C.
25–27 American National Cattlemen's Association, San Antonio, Tex.
26 National Highway Research Board, Washington, D.C.
28–Feb. 2 American Society of Civil Engineers, Water Resources Conference, Washington, D.C.
31–Feb. 3 Catfish Farmers of America, New Orleans, La.

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From the Administrator:

Putting it all together

Our authors this month didn't stick to a single theme; they wrote about such varied subjects as nature trails for the blind, beef-farming projects, minimum tillage, flood-insurance studies, and watershed protection.

In considering what kind of editorial would fit the issue, I found it difficult to categorize this variety of conservation action. But so is it difficult to categorize or define soil and water conservation today.

SCS employees and conservation district leaders are working today on an incredible array of activities that all come under the banner of conservation. At one time a district conservationist was likely to be spending his time making gully plugs, planting trees, building terraces. We're still doing these time-honored "nuts-and-bolts" jobs. But in addition, on any given day, a district conservationist working with people on the land may be involved in any one of the many subjects discussed in this issue—or several of them in the same day.

He has to have a much wider angle of view than may have been necessary a few years back. He needs to be no less a technician than he ever was—but a whole lot more of other things.

A well-trained district conservationist today has to be able to work with a whole jigsaw puzzle of natural resource needs and community interests. It's a puzzle that seems to have more and more pieces every day. The American landscape and the demands on it are more diverse, more complex, than at any time in history. Therefore the problems that local people and SCS employees wrestle with daily are more complex, and these in turn make SCS programs more complex.

The common thread to all our varied activities is *people involvement*. Our district conservationists have to and do work with many kinds of people who have become involved in conservation action in different ways, for different reasons, and with different motives. Some people wish to use our services because they will benefit; some wish to help in conservation efforts to benefit other people or the community at large; some who do not necessarily want to use our services observe our actions.

Working with all these people and blending their interests to the natural resources at hand are challenges we all must meet. We need to place their concerns and ours in a perspective that brings mutual understanding. We need to be innovative, and encourage innovation, and place new issues and new conditions that arise into the right place in the jigsaw puzzle.

The result is a balanced soil and water conservation program that meets the total interest of America's communities.

Kenneth E. Grant